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EXAMINER

BROOKE, MICHAEL S

ART UNIT

PAPER NUMBER

2853

DATE MAILED: 01/15/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/057,026

Applicant(s)

CHEN ET AL.

Examiner

Michael S. Brooke

Art Unit

2853

NP

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --***Period for Reply****A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.**

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1) Responsive to communication(s) filed on 13 December 2002.

2a) This action is FINAL.      2b) This action is non-final.

3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4) Claim(s) 1-20 is/are pending in the application.

4a) Of the above claim(s) 1-10 is/are withdrawn from consideration.

5) Claim(s) \_\_\_\_\_ is/are allowed.

6) Claim(s) 11-20 is/are rejected.

7) Claim(s) \_\_\_\_\_ is/are objected to.

8) Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

9) The specification is objected to by the Examiner.

10) The drawing(s) filed on \_\_\_\_\_ is/are: a) accepted or b) objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11) The proposed drawing correction filed on 13 December 2002 is: a) approved b) disapproved by the Examiner.  
If approved, corrected drawings are required in reply to this Office action.

12) The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

13) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a) All b) Some \* c) None of:

- 1) Certified copies of the priority documents have been received.
- 2) Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
- 3) Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

14) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) The translation of the foreign language provisional application has been received.

15) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

1) Notice of References Cited (PTO-892)  
2) Notice of Draftsperson's Patent Drawing Review (PTO-948)  
3) Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_.

4) Interview Summary (PTO-413) Paper No(s) \_\_\_\_\_.  
5) Notice of Informal Patent Application (PTO-152)  
6) Other: \_\_\_\_\_.

## DETAILED ACTION

### *Election/Restrictions*

1. Applicant's election without traverse of Group 2, species1 in Paper No. 4 is acknowledged.
2. Claims 1-10 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected group, there being no allowable generic or linking claim. Election was made **without** traverse in Paper No. 4

### *Drawings*

3. The corrected or substitute drawings were received on 12/13/02. These drawings are acceptable.

### *Claim Objections*

4. Claim 11 is objected to because of the following informalities: This claim recites a "first and second insulting material layer...on said top and bottom surfaces." This language means that a first and second layer is formed on both the top and bottom surfaces. This is not correct. The Applicant should amend the language to reflect that the first layer is formed on one surface and the second layer is formed on the other surface. Appropriate correction is required.

***Claim Rejections - 35 USC § 112***

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. Claims 11-20 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

**Claim 11:**

- This claim is unclear because it merges elements of the intermediate structure shown in Fig. 1L with the final structure shown in Fig. 3F. Claim 11 recites that an insulating layer is formed at the bottom of the substrate. This insulating layer is identified as Ref. No. "18" in Fig. 1L. This layer is removed to arrive at the final structure shown in Fig. 3F. Claim 11 also recites an orifice in the seed layer and an aperture in the orifice plate. The aperture is identified by Ref. No. "52" in Fig. 3F. Fig. 1L does not show this aperture, but instead shows a photoresist layer "50" that is patterned to form the aperture. Thus, claim contains elements that are mutually exclusive to both the intermediate structure of Fig. 1L and the final structure of Fig. 3F. For the purposes of examination, the Examiner will examine the final structure, as shown in Fig. 3F, which does not have a layer formed of the bottom of the substrate.

***Claim Rejections - 35 USC § 103***

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 11, 12, 14-17 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Leban (EP 317 171) in view of Mitani et al. (5,831,648), Taub et al. (5,308,442) and Hawkins et al. (6,214,245).

Leban teaches a monolithic ink jet print head comprising a silicon substrate (32), two spaced apart heaters (42 and 44) made of TaAl (p. 3:43) are formed on the top surface of the substrate. Heater (42) is provided to ejected ink and heater (44) is provided to improve refill speed. At least two interconnects are provided, wherein each interconnect is in communication with one of the resistors. An insulation layer (46) is formed on top of the spaced apart heaters. This layer is the same as the claimed third insulating layer. A barrier layer (48), having a thickness of between 100,000 to 750,000 Å (see Table), is made of VACREL or RISTON, both of which are photoimagable materials. The layer (48) is the same as the claimed first photoresistive layer. As can be seen in Fig. 1B, the ink chamber has primary and auxiliary (52) portions, wherein the heater (44) is positioned in the auxiliary portion and the heater (42) is positioned in the primary ink chamber. A nickel orifice plate (56) is provided on the barrier layer (48). Leban is silent as to the shape of the ink feed slot, however, Fig. 5 does show that the ink is feed from below and through the substrate. <sup>+54</sup>

Leban teaches the claimed invention with the exception of a first insulating layer made of silicon dioxide and having a thickness of at least 1000 Å, a funnel shaped manifold in the substrate, a metal seed layer on the first photoresistive layer, a nickel layer on top of the metal seed layer, the heater in the primary ink chamber being ring-shaped and the seed layer being either Ni or Cr.

Mitani et al. teaches (Fig. 31) an ink jet print head comprising a silicon substrate (301) and a silicon dioxide insulation layer (317) formed between the substrate and a heater (303). The insulation layer is about 1 to 2 microns thick (10,000 to 20,000 Å) and insulates the substrate from heat generated by the heater (col. 24:21-25).

It would have been obvious to one of ordinary skill in the ink jet art at the time the invention was made, to have provided Leban with a silicon dioxide insulating layer having a thickness of at least 1000 Å for the purpose of insulating the substrate from the heat generated by the heater, as taught by Mitani et al.

Taub et al. teaches an ink jet print head having funnel shaped ink fill slots formed therein. The use of an ink slot having this provides increased flow capacity to adequately respond to ink volume demands (col. 1:56-59).

It would have been obvious to one of ordinary skill in the ink jet art at the time the invention was made, to have provided Leban with a funnel shaped manifold for the purpose of adequately responding to ink volume demands, as taught by Taub et al.

Hawkins et al. teaches a method of forming an orifice plate for an ink jet print head wherein a Ni or Cr seed layer (444) is formed over a substrate and then a plate layer of nickel (446) is deposited over the seed layer, so that the seed layer and the

plate layer form a nozzle plate (445) (col. 8:52-65). The use of the seed layer allows for the production of very small or critically dimensioned nozzle plates which are thin and flexible (col. 8:27-30).

It would have been obvious to one of ordinary skill in the ink jet art at the time the invention was made, to have provided Leban with a metal seed layer on the first photoresistive layer, a nickel layer on top of the metal seed layer, for the purpose of making a nozzle plate that is very small or critically dimensioned and which is thin and flexible, as taught by Hawkins et al.

9. Claims 13 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Leban (EP 317 171) in view of Mitani et al. (5,831,648), Taub et al. (5,308,442) and Hawkins et al. (6,214,245), as applied to claims 11, 12, 14-17 and 20 above, and further in view of Moon et al. (US 2002/0012027).

Leban, as modified, teaches the claimed invention with the exception of a ring-shaped heater positioned in the primary ink chamber.

Moon et al. teaches (Fig. 5) an inkjet print head having a ring shaped heater (50') that is centered under nozzle (102a). The use of a ring-shaped heater simplifies manufacturing, prevents satellite droplets and prevents cross-talk with adjacent nozzles (p. 2:0037).

It would have been obvious to one of ordinary skill in the ink jet art at the time the invention was made, to have provided Leban with a ring-shaped heater in the primary chamber, for the purposes of simplifying manufacturing, preventing satellite droplets and preventing cross-talk with adjacent nozzles, as taught by Moon et al.

### ***Response to Arguments***

10. Applicant's arguments filed 12/13/02 have been fully considered but they are not persuasive.

Applicant's argument that the prior art does not teach a first and a second insulating material layer is not persuasive. As discussed above, claim 11 inappropriately combines features that are found exclusively in the intermediate product and features that are found exclusively in the final product. The final product, as shown in Figs. 3A-3F does not have both a first and a second insulating layer. Therefore, the invention, as interpreted by the examiner, does not have both a first and a second insulating layer.

Applicant's argument that Leban does not teach a photoresist barrier layer that is at least 2000 angstroms thick for forming a primary and an auxiliary ink chambers, is not persuasive. The Applicant acknowledges that Leban teaches a photoresist layer having a thickness of 100,000 to 750,000 angstroms. As can be seen in Fig. 5 of Leban, a primary chamber (54) and a secondary chamber (52) are in fluid communication with each other.

Applicant's argument that the funnel-shaped ink fill slots of Taub et al. are not in fluid communication with an ink chamber is not persuasive. Looking at Figs. 1, 2 and 4a, for example, the ink fill slot passes from the ink chamber, which contains resistors (16), through the substrate (12), to an ink supply located below the substrate.

The Applicant further argues that the ink fill slot is itself an ink jet ejector. The examiner does not understand this argument. The ink slot is not an ejector. The ink slot supplies ink to the resistors (16), which are the ejectors.

### ***Conclusion***

11. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael S. Brooke whose telephone number is 703-305-0262. The examiner can normally be reached on M-F 5:30-2:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John Barlow can be reached on 308-3126. The fax phone numbers for the organization where this application or proceeding is assigned are 703-305-3431 for regular communications and 703-305-3431 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-305-4900.

Michael S. Brooke  
Examiner  
Art Unit 2853

MSB  
January 8, 2003

  
John Barlow  
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